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Discovery

Documentation of Indigenous Knowledge for the Treatment of Diarrhea, Diabetes, Dysentery, Eczema, Liver complaints, Heart and Menstrual diseases at Jamtala Village of Chapai Nawabganj District, Bangladesh

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ABSTRACT

This study was carried out in order to determine which plants and the ways in which these plants are used for the treatment of seven important human diseases among the tribal people of Jamtala village located in the district of Chapai Nawabganj, Bangladesh. During the field trips, the information was collected through interviews, including various data obtained from local healers and traditional medicine men, herbalists, patients and elderly persons. A total of 43 plants belonging to 30 families were documented for their therapeutic use. Further analysis on the families of medicinal plants has shown that family Moraceae, Euphorbiaceae and Caesalpiniaceae are represented by the highest number of species. For each species scientific name, local name, family name, habit, ailments, treatment process and parts used are provided. The results suggest that the tribal practitioners treated seven important human diseases with plants, which scientists may benefit from further studies in their continuous quest for newer and better drugs.

Keywords: Medicinal Plants, Indigenous Uses, Drug development, Chapai Nawabganj, Bangladesh

1. INTRODUCTION

Background information: From the dawn of human civilization, plants are playing most important role for the source of medicine. Many studies have shown that over 80% of people in developing countries depend on the traditional medicines for their basic primary health (Bannerman, 1982). Exploitation of natural sources for the development of traditional medicinal preparations, and also of bioactive molecules, leads and therapeutic agents has acquired a time-tested reputation (Paterson and Anderson, 2005). Of the various natural sources examined, plants proved to have high potential and yielded maximum number of commercially viable therapeutic agents (Koehn and Carter, 2005). Biodiversity has been realized to be the key driven in natural source based drug discovery (Chin et al., 2006). WHO depicts that over 80% of world's population depends on biological resources for their primary healthcare demands (WHO, 1999). Plants have always formed an excellent source for modern drugs. Bangladesh is rich in floral species and it has been estimated that more than 5,000 floral species exist within the country, which is small in size. Bangladesh also has a rich history of traditional medicinal practices like Ayurveda, Unani, Folk medicine, and home remedies, all of which utilize plants to a major extent for treatment (Ghani, 2003).

Review of literatures: Studies on ethno-medicinal information of ethnic communities in Bangladesh are at initial stage. Several ethno-medicinal studies in Bangladesh have been carried out by Alam (1992), Alam et al (1996), Chakma et al (2003), Shahnaj et al (2016), Choudhury and Rahmatullah (2012), Faruque and Uddin (2014), Khisha (1996), Rahman et al (2008a, 2008b, 2010, 2012, 2013a, 2013b, 2013c, 2013d, 2014a, 2014b, 2014c, 2015), Rahman and Akter (2013), Rahman and Khanom (2013), Rahman (2013a, 2013b, 2013c, 2014d, 2013e, 2013f, 2013g, 2013h, 2013i, 2013j, 2013k, 2014a, 2014b, 2015a, 2015b, 2015c), Rahman and Gulshana (2014), Jamila and Rahman (2016), Rahman and Parvin (2014), Rahman and Rahman (2014), Rahman and Rojonigondha (2014), Rahman and Kumar (2015), Roy et al (2016), Rahman and Keya (2015), Rahman and Debnath (2015) and Uddin et al (2001, 2004, 2006, 2008, 2012, 2014). The objective of this study was to document the medicinal practices of Santal tribal practitioners to cure seven (7) important human diseases in Jamtala village of Chapai Nawabganj district, Bangladesh.

2. MATERIALS AND METHODS

Study area: Jamtala is a village under Nawabganj Sadar upazila of Chapai Nawabganj in the Division of Rajshahi Bangladesh. Nawabganj upazila area is 451.78 km^2 located in between 24°36'N 88°16'E Coordinates: 24°36'N 88°16'E. It is bounded by Gomastapur upazila on the north, on the north-east nachole, on the west shibganj and on the south-east Rajshahi Zila. The climate of this village is generally tropical wet and dry climate, characterized by high temperatures, heavy monsoon, moderate rainfall and high humidity. The hot season commences early in March and continues till the middle of July. The maximum mean temperature observed is about 32 to 36 °C (90 to 97 °F) during the months of April, May, June and July and the minimum temperature recorded in January is about 7 to 16 °C (45 to 61 °F). The highest rainfall is observed during the months of monsoon. The annual rainfall in the district is about 1,448 millimetres (57.0 in).This seasonal variation of rainfall and temperature influences the cultivation and conservation of medicinal plants. It also influence farming practices of the local people (BBS, 2009).

Data collection: A total of twenty one field trips were made for the documentation of ethno-botanical knowledge during July 2013 to June 2015. During the field interview, the information was noted in the documentation data sheet. All the information regarding plant species, biological forms, habitat, local names and uses was documented. Medicinal information was obtained through semi-structured interviews with knowledgeable people such as local Kabiraj/Herbalists and elderly people. Plant specimens were collected with flowers and fruits and processed using standard herbarium techniques (Alexiades, 1996).

Plant identification: The identification of plant specimens was achieved through the help of taxonomic experts and by comparison with the identified herbarium specimens and available literatures, i.e. Ahmad et al (2008-2009), Nahar and Rahman (2016), Hooker (1961), Prain (1963), Kirtikar and Basu (1987), Huq (1986) and Pasha and Uddin (2013). The voucher specimens are deposited at the Herbarium, Department of Botany, Rajshahi University for future reference.

3. RESULTS AND DISCUSSION

In the present research documented, a total of 43 plant species belonging to 41 genera and 30 families were recorded (Table 1). Out of these plants species, 19 (44.18%) belonged to trees, 14 (32.55%) herbs, 7 (16.27%) shrubs and 3 (6.97%) climbers (Figure 1). For each species scientific name, local name, family, habit, mode of uses and part(s) used are provided. The most frequently used species for the treatment of different diseases are *Abroma augusta* (L.) f., *Acacia nilotica* (L.) Del., *Aegle marmelos* (L.) Corr., *Amaranthus spinosus* L., *Andrographis paniculata* Wall ex Nees., *Artocarpus heterophyllus* Lamk., *Cocos nucifera* L., *Costus speciosus* (Koenig) Sm., *Carissa carandas* L., *Coccinia grandis* (L.) Voigt., *Eclipta alba* (L.) Hassk., *Elaeocarpus robustus* Roxb., *Feronia limonia* (L.) Swingle, *Ficus racemosa* L., *Ficus benghalensis* L., *Jatropha gossypifolia* L., *Leonurus sibiricus* L., *Portulaca oleracea* L., *Psidium guajava* L. *Persicaria hydropiper* L., *Senna alata* (L.) Roxb., *Syzygium cumini* (L.) Skeel., *Tamarindus indica* L., *Terminalia arjuna* (Roxb. ex DC.) Wight & Arn., *Tinospora cordifolia* Willd. and *Withania somnifera* (L.) Dunal (Table 1).

The survey has also recorded 7 categories of uses of 43 medicinal plants. This is the indication of rich knowledge of medicinal uses of plants by the Santals in the study area. Among them, 8 (18.60%) species were used to cure diabetes, 12 (27.90%) species for diarrhea, 15 (34.88%) species for dysentery, 5 (11.62%) species for eczema, 5 (11.62%) species for menstrual disease, 3 (6.97%) species for heart disease and 3 (6.97%) species for liver complaints (Figure 2). Distribution of medicinal plant species in the families shows variation. Moraceae is represented by 5 species; Euphorbiaceae is represented by 4 species; Caesalpiniaceae is represented by 3 species. Each of Arecaceae, Amaranthaceae, Rutaceae, Lamiaceae and Myrtaceae is represented by 2 species while a single species in each was recorded by 22 families (Table 1). The survey indicated that the common medicinal plant families in the study area are Acanthaceae, Amaranthaceae, Apocynaceae, Arecaceae, Asteraceae, Bombacaceae, Cucurbitaceae, Combretaceae, Convolvulaceae, Euphorbiaceae, Lamiaceae, Menispermaceae, Moraceae, Musaceae, Myrtaceae, Poaceae, Polygonaceae, Punicaceae, Portulacaceae, Rutaceae, Solanaceae and Tiliaceae. This finding of common medicinal plant families in the study is in agreement with Anisuzzaman et al (2007); Ghani (2003); Khan and Huq (1975), Khan (1998), Kona and Rahman (2016), Jamila and Rahman (2016a, 2016b), Nahar et al (2016), Jamila et al (2016), Islam and Rahman (2016) and Yusuf et al (2006, 2009).

Table 1 Medicinal plants used by Santal tribal practitioners at Jamtala Village of Chapai Nawabganj District, Bangladesh

S/N	Scientific Name	Local Name	Family Name	Habit	Parts used	Diseases and mode of uses
01	*Abroma augusta* (L.) f.	Ulat Kambal	Sterculiaceae	Shrub	Root, bark	Root bark extracts is used in regulates irregular menses.
02	*Acacia nilotica* (L.) Del.	Babla	Mimosaceae	Tree	Pod	Pods are prescribed in dysentery.
03	*Aegle marmelos* (L.) Corr.	Bel	Rutaceae	Tree	Root	Roots extract mixed with cow milk and sugar is taken to cure dysentery. Juice of root mixed with water is used in heart disease.
04	*Amaranthus*	Katanotey	Amaranthaceae	Herb	Leaf	Leaves juice is used for

	spinosus L.					dysentery.
05	*Andrographis paniculata* Wall ex Nees	Kalo megh	Acanthaceae	Herb	Leaf	Juice obtained from macerated leaves is mixed with water is used in liver disorders.
06	*Artocarpus heterophyllus* Lamk.	Kathal	Moraceae	Tree	Root	Decoction of roots is used for diarrhea.
07	*Bambusa arundinacea* (Retz.) Willd	Bash	Poaceae	Tree	Leaf bud	Decoction of the leaf bud is administered to encourage free discharge of menses or lochia after delivery.
08	*Borassus flabellifer* L.	Taal	Arecaceae	Tree	Young leaf	The juice of young leaves mixed with water is given in cases of dysentery.
09	*Cocos nucifera*L.	Nari kel	Arecaceae	Tree	Fruit	Water of unripe fruit is used in dysentery and diarrhea.
10	*Costus speciosus* (Koenig) Sm.	Keu	Costaceae	Herb	Tuber	Chutney made from the burnt tuber, sugar and tamarind taken for dysentery.
11	*Celosia cristata* L.	Morog ful	Amaranthaceae	Herb	Flower	Juice made from flowers extract is used for excessive menstrual discharges.
12	*Carissa carandas* L.	Karomcha	Apocynaceae	Tree	Fruit	The fruit has been used remedy for diabetes.
13	*Coccinia grandis* (L.) Voigt	Tela kucha	Cucurbitaceae	Climber	Leaf	Warmed juice obtained from plant is used in diabetes.
14	*Corchorus capsularis* L.	Titapat	Tiliaceae	Shrub	Leaf	Crushed leaves mixed with water are useful in acute dysentery.
15	*Croton bonplandianum* Baill.	Croton	Euphorbiaceae	Herb	Seed	Seed paste is applied locally on eczema.
16	*Curcuma longa* L.	Holud	Zingiberaceae	Herb	Rhizome	Paste made from rhizome is

						used in eczema.
17	*Eclipta alba* (L.) Hassk	Kalo Keshi	Asteraceae	Herb	Whole plant	Grinding, decoction; Taken orally for infantile diarrhea.
18	*Elaeocarpus robustus* Roxb.	Jolpai	Elaeocarpaceae	Tree	Fruit	Unripe fruits prescribed in diarrhea and dysentery.
19	*Feronia limonia* (L.) Swingle	Kodbel	Rutaceae	Tree	Seed	Powder of seeds mixed water is taken for heart disease.
20	*Ficus hispida* L. f.	Khoka dumur	Moraceae	Tree	Fruit	Fruits juice mixed with water is prescribed for diabetic patients
21	*Ficus racemosa* L.	Jag dumur	Moraceae	Tree	Gum	Gum is used mixed with water for treatment of diabetes and diarrhea.
22	*Ficus benghalensis* L.	Bot	Moraceae	Tree	Young bud	Decoction of young buds is used in diarrhea and dysentery.
23	*Ipomoea aquatica* Forssk.	Kalmi shak	Convolvulaceae	Climber	Leaf	Dried leaves powder mixed with water is used in liver complaints.
24	*Jatropha gossypifolia* L.	Lal kundu	Euphorbiceae	Shrub	Leaf	Juice made from leaves is used in diabetes.
25	*Leucas cephalotes* (Roth.) Spreng.	Danda kolos	Lamiaceae	Herb	Leaf	Paste made from leaves is used in eczema.
26	*Leonurus sibiricus* L.	Rakto drone	Lamiaceae	Herb	Fruit	Dried fruit powder is used in menstrual diseases.
27	*Musa sapientum* Linn.	Kola	Musaceae	Herb	Bark	Spadix is taken as curry to control diabetes.
28	*Nymphaea nouchali Burm*. f.	Sapla	Nymphaeaceae	Herb	Rhizome	Dried powder of rhizomes mixed with normal water is used in dysentery.
29	*Nelumbo nucifera* Gaertn.	Poddo	Nelumbonaceae	Herb	Flower	Decoctions of flowers are used for liver disease
30	*Persicaria hydropiper* L.	Pani Morich	Polygonaceae	Herb	Whole plant	Pound fresh part applied on the affected area, treating for eczema.

31	*Psidium guajava* L.	Peyara	Myrtaceae	Tree	Root	Root paste mixed with water is used to treat diarrhea and dysentery.
32	*Punica granatum* Linn.	Dalim	Punicaeae	Tree	Fruit	Fruits juice is used for diarrhea.
33	*Phyllanthus reticulatus* Poir.	Chitki	Euphorbiaceae	Shrub	Leaf	Leaves juice with water is taken orally for diarrhea of infants.
34	*Portulaca oleracea* L.	Nunia shak	Portulacaceae	Herb	Whole plant	Decoction of whole plant mixed with fresh water taken to cure diarrhea.
35	*Ricinus communis* L.	Bherenda	Euphorbiaceae	Shrub	Leaf	Juice of tender leaves is given with sugar in dysentery.
36	*Saraca indica* L	Ashok	Caesalpinaceae	Tree	Root, bark	Juice of root extract is used in dysentery. Juice of bark extract is used in irregular menses.
37	*Senna alata*(L.) Roxb.	Dad mardan	Caesalpiniaceae	Shrub	Leaf, Flower, Stem-bark	Decoction of leaves and flowers is used for eczema. Paste made from stem bark is also used in eczema.
38	*Streblus asper* Lour.	Sheora	Moraceae	Tree	Bark , stem	Bark and stem extracts mixed with water used in dysentery.
39	*Syzygium cumini* (L.) Skeel.	Jam	Myrtaceae	Tree	Fruit	Fruits juice is used in diabetes.
40	*Tamarindus indica* L.	Tetul	Caesalpiniaceae	Tree	Fruit, pulp	Juice made from fruits is used in diarrhea. Pulp of the ripe fruit is a household remedy for dysentery.
41	*Terminalia arjuna* (Roxb. ex DC.) Wight & Arn.	Arjun	Combretaceae	Tree	Stem bark	Stem bark extracts mixed with cold water is taken to cure heart disease.
42	*Tinospora cordifolia* Willd.	Guloncho	Menispermaceae	Climber	Leaf stalk	Leaf stalk powder mixed with neem paste is used in diabetes.
43	*Withania*	Aswa	Solanaceae	Shrub	Leaf	Infusion powder of 2-3 leaves

somnifera (L.) Dunal.	gandha				mixed with water is used for diarrhea.

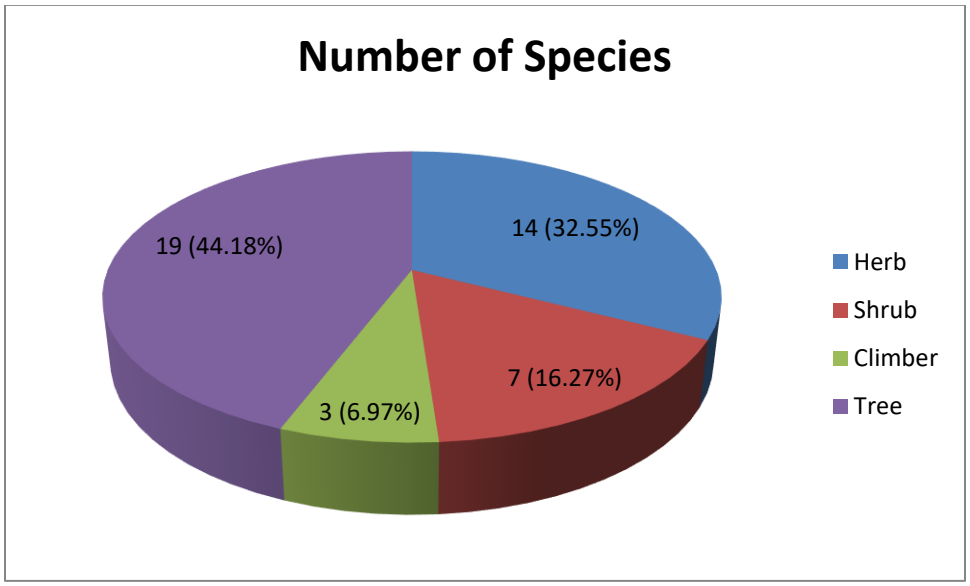

Figure 1 Habit analyses of plant species in the study area

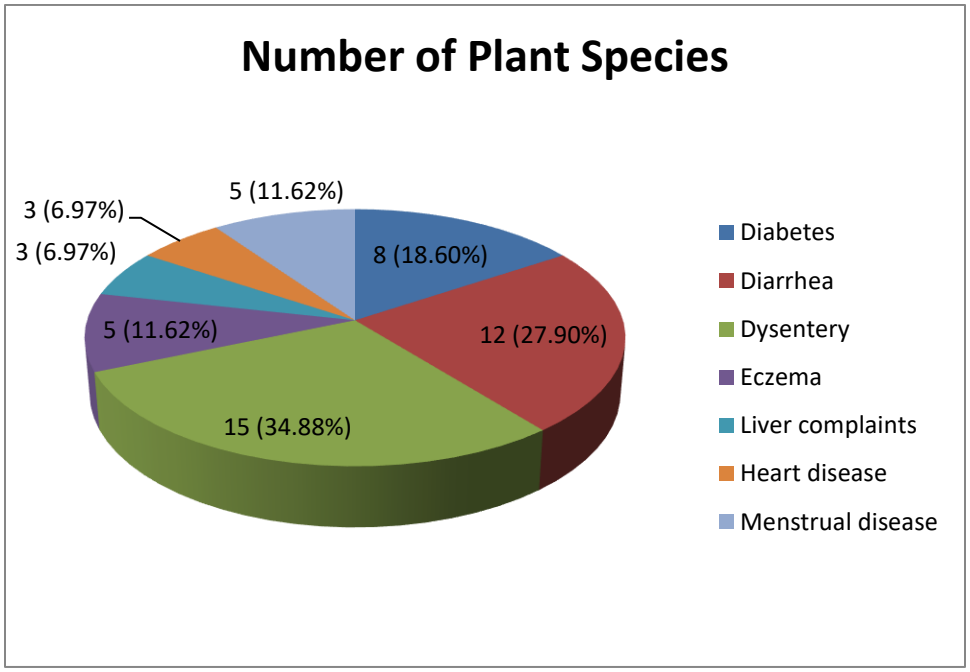

Figure 2 Number of plant species used for different diseases

Abroma augusta

Withania somnifera

Tinospora cordifolia

Terminalia arjuna

Tamarindus indica

Syzygium cumini

Streblus asper

Senna alata

Saraca indica

Ricinus communis

Portulaca oleracea

Phyllanthus reticulatus

Punica granatum

Psidium guajava

Persicaria hydropiper

Nelumbo nucifera

Figure 3 Photographs of Important Medicinal Plants

Figure 4 Interview with tribal practitioners in the study area

4. CONCLUSION

The present study deals with identification of 43 plant species belonging to 30 families, used by the tribal people in Jamtala village of Chapai Nawabganj district for their seven important diseases. The traditional healers are the main source of knowledge on

medicinal plants. This knowledge has been transmitted orally from generation to generation. The documentation of plants used as traditional medicines in tribal community is needed so that this veritable treasure of knowledge can be preserved, shared and exploited sustainability. The research article might attract the attention of ethno-botanists, phytochemists and pharmacologists for future critical investigation of plants present in the village Jamtala of Chapai Nawabganj district, Bangladesh.

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